

# 10-3 What are two kinds of electric current?

**Objective** ▶ Differentiate between direct current and alternating current.

## TechTerms

- ▶ **alternating current:** current in which electrons change direction at a regular rate
- ▶ **direct current:** current in which electrons always flow in the same direction
- ▶ **electric current:** flow of electrons through a conductor

**Electric Current** When a conductor is connected to two oppositely charged objects, electrons will flow through the conductor. The flow of electrons through a conductor is called **electric current**. The number of electrons flowing determines the amount of electric current.

► **Define:** What is electric current?

**Direct Current** Current that always flows in the same direction is called **direct current (DC)**. Figure 1 shows the positive and negative poles of a battery connected to a wire. The wire is connected to a small lamp. The electric current from the battery keeps the lamp lit. Notice that the current flows from the negative pole to the positive pole of the battery. The current flows in one direction. All batteries provide direct current.

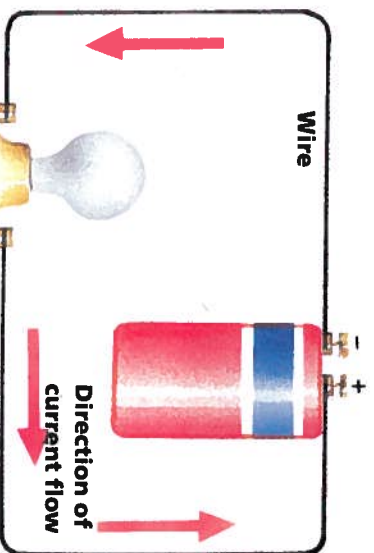


Figure 1

► **Define:** What is direct current?

**Alternating Current** Current that changes direction at a regular rate is called **alternating current (AC)**. The type of electricity used in homes is alternating current. Most of the electricity that is used in everyday life comes from alternating current, not from direct current. There is a practical reason why alternating current is used.

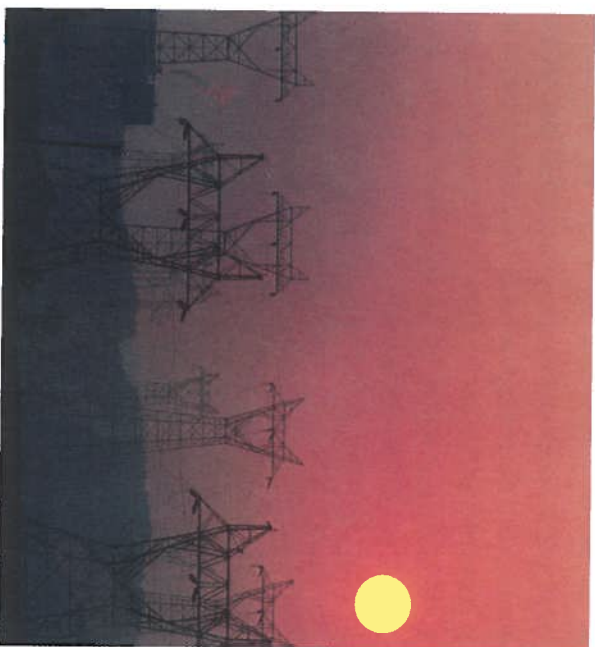


Figure 2

Wires carrying direct current become hot. An electric power plant sends electricity over long cables to reach your home. The heat from large amounts of direct current would damage the cables. As a result, the power plant cannot use direct current to transport the electricity. Alternating current produces less heat. For this reason, alternating current is used.

Most household appliances use alternating current. However, some appliances need direct current. A built-in converter in these appliances changes alternating current into direct current.

► **Explain:** Why is alternating current used by power plants?

## LESSON SUMMARY

- ▶ The flow of electrons through a conductor is called electric current.
- ▶ Direct current always flows in the same direction.
- ▶ Alternating current changes direction at a regular rate.
- ▶ Alternating current is the most commonly used type of electricity because it does not create as much heat as direct current.

**CHECK** Complete the following.

1. The flow of electrons through a conductor is called \_\_\_\_\_.
2. Current that changes direction at a regular rate is called \_\_\_\_\_ current.
3. A battery is a source of \_\_\_\_\_ current.
4. The type of electricity supplied by electric power plants is \_\_\_\_\_.
5. In a battery, current flows from the \_\_\_\_\_ pole to the \_\_\_\_\_ pole.

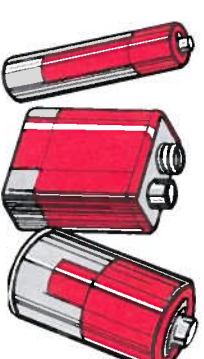
**APPLY** Complete the following.

6. What type of current does a television use?
7. **Explain:** Why do electric power plants not transmit direct current?
8. **Infer:** What type of current does a car battery provide?

## Ideas in Action

**IDEA:** Batteries are often used as a source of direct current.

**ACTION:** Look at different types of batteries, from size AA to a transistor radio battery. Where is the positive pole of the battery? Where is the negative pole? In what direction does the current flow?



## LEISURE ACTIVITY

### BUILDING MODEL ELECTRIC TRAINS

Many people enjoy building and running model trains. Some trains use direct current provided by a dry cell. Others use alternating current from a wall outlet. Most electric trains run on AC current. A transformer changes the AC current from an outlet into the small amount of AC current used by the train.

The basic equipment for a model railroad includes train tracks, several railroad cars, and a locomotive. Electric wires connected from a control board to the train set allow one or more trains to run at the same time.

Building model trains first became a popular hobby in the 1930s. Model railroads were shown at the Chicago World's Fair in 1934. The National Model Railroad Association was organized in 1935. If you are interested in building model trains, write to your local model railroad club or a model railroad magazine.

